

**DEPARTMENT OF THE ARMY**  
WOMACK ARMY MEDICAL CENTER  
Fort Bragg, North Carolina 28310

MEDCEN Memorandum  
No. 40-51

10 May 01

Preventive Medicine  
**MEDCEN INTERIM GUIDELINES FOR MANAGEMENT OF HEAT CASUALTIES**

**1. PURPOSE.** To provide guidelines for the management and treatment of patients who have sustained exertional heat illness at Ft. Bragg.

**2. APPLICABILITY.** These guidelines will apply to all health care providers at Ft. Bragg.

**3. CATEGORY, TREATMENT, AND DISPOSITION**

a. Exertional heat illness is multi-system illness generally presenting as staggering or collapse during or immediately following exercise, confusion/amnesia, or inability to continue work. Symptom combinations vary and include dizziness, fatigue, headache, visual abnormalities, thirst, muscle cramps, gastrointestinal (GI) distress, elevated core body temperature, and/or altered mental status.

b. There will generally be two groups of patients, although categorization is sometimes indistinct. Group A patients may progress to Group B if not receiving prompt and adequate treatment:

(1) Group A - Mild Exertional Heat Illness (Heat exhaustion, Exertional dehydration, Heat cramps, potential Hyponatremia). Patients who present alert with appropriate behavior, near-normal and rapidly stabilizing vital signs, and able to drink fluids. These patients may receive care outside of the hospital. However, upon first realization that the patient might not fully recover within one hour, evacuation should be quickly arranged to an Emergency Department without further delay.

(2) Group B - Severe Exertional Heat Illness (Heat stroke, Exertional heat injury, Rhabdomyolysis). Patients whose presentation includes any of the following: history of mental status changes or amnesia, history of syncope or seizure, unable to drink fluids, rectal temp >104°F, systolic BP <90 or orthostatic symptoms, severe muscle or abdominal pain (or numbness). Treatment must be more aggressive for Group B, all of whom will require laboratory evaluation, follow-up the next day, and profiling. Group B patients will all be evaluated in an Emergency Department (with immediate treatment beginning before and continuing during evacuation).

c. Initial assessment, vital signs, and treatment (including cooling if rectal temp >103°F) should begin immediately in the field. For all patients coming to the WAMC Emergency Department, field treatment and conditions must be documented on the **Pre-hospital Exertional Heat Illness Form**. The medic should obtain the information to fill out this form completely (or bring an individual who can provide this information to the Emergency Department).

**d. Group A Field Treatment Protocol:**

(1) All patients should be placed at rest in the shade, clothing loosened, and cooling started if rectal temp >103°F. Stop aggressive cooling at 102°F to avoid hypothermia.

(2) Repeat vital signs (including mental status assessment) every 5-10 minutes until stable and rectal temperature is consistently below 100°F.

(3) Oral or IV rehydration (2 liter maximum) with a standard replacement solution (e.g., ORAL -- water, sports beverage, or 0.5% salt solution [1 teaspoon per quart of water]; IV - normal saline) until patient voids. Persistent symptoms beyond one hour, recurrent vomiting, or worsening of condition in the field requires evacuation to an Emergency Department (ED).

(4) Obtain urine and do dip stick (if available). No patient leaves medical treatment until providing urine. Blood on dipstick requires evacuation to an Emergency Department.

(5) Disposition:

(a) Group A patients treated in the field who fully recover within one hour and up to two liters of rehydration may return to light duty on a profile for the remainder of the day and full duty the next day. These patients do not require further medical evaluation or reporting.

(b) Group A patients who do not fully recover within one hour or will require more than two liters of rehydration must be evaluated in an Emergency Department, usually to include laboratory tests, reporting, follow-up, and profiling. (See Group B guidelines)

e. **Group B Guidelines for Emergency Care:**

(1) Advanced Cardiac Life Support (ACLS) procedures as required. Place patient on monitor and obtain EKG. Apply oxygen as needed to maintain SaO<sub>2</sub>>95%.

(2) Remove clothing except underwear (provide for privacy).

(3) Cooling (if rectal temp >103°F), with ice water and fans when available, until rectal temperature is 102°F. Stop aggressive cooling at 102°F to avoid hypothermia.

(4) Repeat vital signs (including mental status assessment) every 5-10 minutes until stable and rectal temperature is consistently below 100°F. Continuous measurement of temperature by means of rectal probe is the preferred method. Record on **Nursing Exertional Heat Illness Form**.

(5) IV hydration (usually rapid infusion of 1-3 liters of normal saline) until patient is presumed rehydrated and clinically stable. Record on **Nursing Exertional Heat Illness Form**.

(6) Order ER-Heat Injury laboratory set and record results on **Preventive Medicine Exertional Heat Illness Form**.

(7) Obtain urine and send for complete urinalysis with microscopic; record amount on **Nursing Exertional Heat Illness Form** and results on **Preventive Medicine Exertional Heat Illness Form**. No patient leaves medical treatment until providing urine. Presence of myoglobinuria should lead to strong consideration for hospitalization.

(8) Obtain information and fill out **Provider Exertional Heat Illness Form** and **Preventive Medicine Exertional Heat Illness Form** completely. A copy of the patient's SF 558 (Emergency Care and Treatment Form), copy of the SF 509 (Nursing Notes) and a copy of the Heat Packet will be placed in the "PREVENTIVE MEDICINE" box in the medication preparation area of the ED Team Center. These will be picked up daily from the WAMC Emergency Department by the Department of Preventive Medicine and taken to the Epidemiology and Disease Control (EDC) Clinic for use in administrative follow-up.

(9) Disposition:

(a) Mildly ill patients who appear to be fully recovered in the Emergency Department and have no laboratory abnormalities may return to light duty the next day and limited duty the following day. However, important deficits are sometimes subtle or delayed, and the patient should be carefully observed. Maximal exercise (e.g., APFT, airborne operations, road marching) should be avoided for several days. Provide appropriate profile.

(b) Patients not fully recovered and those having laboratory abnormalities require follow-up by a residency-trained physician, with laboratory evaluation, on the following day. They should also be referred to the EDC Clinic (Walk-in weekdays, Bldg. 1-2539 1<sup>st</sup> floor, 432-6925/9302) for reporting, follow-up laboratory review, and Medical Evaluation Board (MEB) referral.

(c) Seriously ill patients require hospitalization. This will generally include those with delirium, obtundation, coma, persistent altered mental status, shock, persistent electrolyte abnormalities, creatinine (Cr) >2.0, or creatinine kinase (CK) >4,000. Table 1 provides clinical guidelines. Upon hospital discharge patients should be referred to the EDC Clinic (Bldg. 1-2539 1<sup>st</sup> floor, 432-6925/9302) for reporting, follow-up laboratory review, and MEB referral.

(d) All patients should remain on P-4(T) profile, quarters, or convalescent leave until all symptoms and laboratory tests have returned to normal (e.g., CK <700, Cr <1.4), and EDC Clinic has cleared the patient (for reportable cases). When fully recovered, the patient may then gradually resume exercise at own pace, building up to maximal exercise over several weeks. Provide appropriate profile.

#### **4. REPORTING AND PROFILING / MEB**

a. All reporting shall be through the EDC Clinic. Patients needing reporting should be placed on P-4(T) profile/quarters/convalescent leave until cleared by the EDC Clinic, which will provide profiling and arrange for MEB if needed.

b. Heat exhaustion/exertional dehydration patients are required to be reported if they require medical intervention and result in more than 4 hours of lost duty time. "Single episodes of heat exhaustion are not cause for MEB referral. However, soldiers suffering from recurrent episodes of heat exhaustion (three or more in less than 24 months) should be referred for complete medical evaluation for contributing factors. If no remediable factor causing recurrent heat exhaustion is identified, then the soldier will be referred to an MEB." (AR 40-501 para 3-46a)

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c. Heat stroke/rhabdomyolysis patients (most of Group B) are required to be reported and referred to an MEB. If the soldier has had full clinical recovery, the MEB should give a 3-month P-3(T) profile, which restricts the soldier from heat exposure and from performing vigorous physical exercise for periods longer than 15 minutes. Maximal efforts, such as the APFT 2-mile run and Airborne operations, are not permitted. If, after three months, the soldier has not manifested any heat intolerance, the profile will be modified to P-2(P) and normal work permitted. Maximal exertion and significant heat exposure (such as wearing MOPP IV) are still restricted. If the soldier manifests no heat intolerance through the next summer, normal activities can be resumed and the soldier may be returned to full unrestricted duty without a PEB. Lack of full recovery, or any evidence of significant heat intolerance during the period of the profile, requires referral to a PEB. (see AR 40-501 para 3-46b)



Table 1  
**Classification and Stratification of Exertional Heat Illness**

<u>Category</u>	<u>Dehydration</u>	<u>Encephalopathy</u>	<u>Renal Function</u>	<u>Cell Lysis</u>	<u>Other</u>
<b>1</b>	Non-specific symptoms	Slow, drowsy, clears rapidly	Cr: <1.5	CK: <700	Non-specific symptoms, max temp <100°F
<b>2</b>	Collapase or orthostatic Sx in field, normal v.s. in ER	Confused/cooperative, clears rapidly	Cr: 1.5-1.7	CK: 700-1,200	Cramps, myalgia resolve in ER, max temp >100°F
<b>3</b>	Exertional syncope or positive tilt test, or abnormal electrolytes, corrected in ER	Confused/uncooperative, clears rapidly, amnesia <10 min	Cr: 1.8-1.9 high urine SG improves	CK: 1,200-4,000, negative labs for rhabdomyolysis	Minor muscle Sx persist, max temp >104°F
<b>4</b>	Patient requires >3 liters IV fluid, or hypotension, or electrolyte abnormality persists	Delirium, obtundation, clears rapidly, amnesia >10 min	Cr: >1.9 improves in ER	CK: 4,000-10,000, negative labs for rhabdomyolysis	Muscle Sx persist, max temp >106°F
<b>5</b>	Mean BP <70, systolic <90, tachycardia persists, Hyponatremia <130	Coma, or CNS signs clear slowly in ER, seizure	Cr: >2 .0 does not improve, or other signs of renal failure	CK: >10,000*, signs of tissue lysis syndrome	Major muscle Sx persist, hypoglycemia, coagulopathy

**Prehospital Exertional Heat Illness Form**

Date: \_\_\_\_\_

Time of onset of illness: \_\_\_\_\_ AM/PM

FIELD WBGT: \_\_\_\_\_ °F

Time of arrival (ED Clock): \_\_\_\_\_ AM/PM

Time of arrival (Prehospital Watch): \_\_\_\_\_ AM/PM

**CIRCUMSTANCES before and at onset of symptoms:**

Activity: Running\* \_\_\_\_\_ \*distance (miles)

Marching\* \_\_\_\_\_ \*distance (miles)

Other \_\_\_\_\_

"In your own words, describe the onset of illness."

**CLOTHING:**PT-Gear: ☐ w/sweatshirt ☐ w/sweatpantShoes: ☐ athletic ☐ bootsBDU's: ☐ w/blouse ☐ w/o blouseAccessories: ☐ hat ☐ helmet ☐ vest ☐ rifle☐ pack \_\_\_\_\_ lbs ☐ MOPP Level \_\_\_\_\_ ☐ Other: \_\_\_\_\_**SIGNS AND SYMPTOMS:**WOBBLY/STUMBLING: ☐ NO ☐ YESCOLLAPSE (No LOC): ☐ NO ☐ YESLOSS OF CONSCIOUSNESS: ☐ NO ☐ YES - DURATION \_\_\_\_\_ (minutes)PAIN/CRAMPS: ☐ NO ☐ YES - LOCATION \_\_\_\_\_

OTHER: \_\_\_\_\_

HYPERVENTILATION: ☐ NO ☐ YESVOMITING: ☐ NO ☐ YESSEIZURE: ☐ NO ☐ YES

1-VS Time: \_\_\_\_\_ T: \_\_\_\_\_ °F P: \_\_\_\_\_ R: \_\_\_\_\_ BP: \_\_\_\_/\_\_\_\_ Orientation: Y / N person

CNS Scale: ☐ 8 (Normal) ☐ 7 ☐ 6 ☐ 5 ☐ 4 ☐ 3 ☐ 2 ☐ 1 (Deep Coma) Y / N place

2-VS Time: \_\_\_\_\_ T: \_\_\_\_\_ °F P: \_\_\_\_\_ R: \_\_\_\_\_ BP: \_\_\_\_/\_\_\_\_ Orientation: Y / N person

CNS Scale: ☐ 8 (Normal) ☐ 7 ☐ 6 ☐ 5 ☐ 4 ☐ 3 ☐ 2 ☐ 1 (Deep Coma) Y / N place

Field Serum Glucose: \_\_\_\_\_ Time: \_\_\_\_\_ Y / N time

**TREATMENT IN FIELD:** Time cooling began \_\_\_\_\_COOLING METHOD: ☐ Remove clothing ☐ Fan ☐ Wet down ☐ Ice packs☐ Oral fluids: Amt: \_\_\_\_\_ (quarts) ☐ Sheets/ice water ☐ Tub ☐ Shower☐ MEDICATIONS/IV FLUID/OTHER: \_\_\_\_\_

Place Patient Label here

Recorder Name/Duty Phone Number (print) \_\_\_\_\_

## Appendix A (cont)

**Nursing Exertional Heat Illness Form**

Date: \_\_\_\_\_

CONDITION ON ARRIVAL: Immediate / Delayed / Minimal / Expectant

**EXAM** (every 5-10 minutes) TIME: \_\_\_\_\_

Rectal Temperature ( F): \_\_\_\_\_

Pulse: \_\_\_\_\_

Respiratory Rate: \_\_\_\_\_

Blood Pressure: \_\_\_\_\_/\_\_\_\_\_/\_\_\_\_\_

Orientation (0-3/3): \_\_\_\_\_/3 \_\_\_\_\_/3 \_\_\_\_\_/3 \_\_\_\_\_/3 \_\_\_\_\_/3 \_\_\_\_\_/3

**CNS scale:**

- 8 Normal (alert, oriented, cooperative)  
 7 Drowsy/Lethargic/Dazed  
 6 Confused - appropriate,  
 5 Confused - inappropriate,  
 4 Delirious - combative  
 3 Obtunded - barely responsive  
 2 Light coma - reflex response to pain  
 1 Deep coma - no response to pain

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

TREATMENT IN CLINIC:

COOLING METHOD: ☐ Water and Fan ☐ Ice Sheets ☐ Immersion in Tub  
☐ Shower ☐ None ☐ Other \_\_\_\_\_

MEDICATIONS/OTHER:

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I. V. FLUIDS				
Time Start	Sol'n	Amt	Time Finish	Amt Infused

P. O. INTAKE		
Time	Type	Amt

OUTPUT		
Time	Type	Amt

Nurse Name/Duty Phone Number (print) \_\_\_\_\_

Place Patient Label here



**Provider Exertional Heat Illness Form**

Date: \_\_\_\_\_

PRIOR HEAT ILLNESS: ☐ NO ☐ YES - Date & Dx: \_\_\_\_\_MEDICATION / SUPPLEMENTS / HERBALS / OTCs:  
\_\_\_\_\_  
\_\_\_\_\_

<b>WATER (qts):</b> last 12h: _____ <b>PUNCH/SODA (qts):</b> last 12h: _____	<b>CAFFEINE:</b> last 12h (# cups/cans) Coffee _____ Tea _____ Colas _____	<b>LAST MEAL:</b> <input type="checkbox"/> light <input type="checkbox"/> mod <input type="checkbox"/> heavy Time: _____ AM/PM Alcohol (# drinks): last 24h: _____	<b>TOBACCO:</b> <input type="checkbox"/> none <input type="checkbox"/> smokeless <input type="checkbox"/> <1 pp <input type="checkbox"/> 1-2 ppd last use (time): <input type="checkbox"/> ≥2ppd _____ AM/PM
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SYMPTOMS (ENTIRE FIRST HOUR):

(re-evaluate when patient has recovered)

<b>GENERAL:</b> N <input type="checkbox"/> Y <input type="checkbox"/> THIRSTY N <input type="checkbox"/> Y <input type="checkbox"/> SCARED/NERVOUS N <input type="checkbox"/> Y <input type="checkbox"/> WEAK N <input type="checkbox"/> Y <input type="checkbox"/> HEADACHE  <b>EXTREMITY MUSCLE:</b> N <input type="checkbox"/> Y <input type="checkbox"/> MYALGIA N <input type="checkbox"/> Y <input type="checkbox"/> CRAMPS loc: _____ <b>SWEATING:</b> <input type="checkbox"/> PRESENT <input type="checkbox"/> NONE <b>SLEEP</b> last 24 hours: _____ hours <b>AMNESIA:</b> <input type="checkbox"/> NO <input type="checkbox"/> YES (List events not remembered before & after onset, & estimate duration of memory loss):  <b>OTHER:</b>	<b>"ORTHOSTATIC":</b> N <input type="checkbox"/> Y <input type="checkbox"/> FAINT/DIZZY N <input type="checkbox"/> Y <input type="checkbox"/> BLURRED VISION N <input type="checkbox"/> Y <input type="checkbox"/> TUNNEL/FADING N <input type="checkbox"/> Y <input type="checkbox"/> VISUAL LIGHTS/SPOTS N <input type="checkbox"/> Y <input type="checkbox"/> WOBBLY/STUMBLING N <input type="checkbox"/> Y <input type="checkbox"/> COLLAPSE - No LOC N <input type="checkbox"/> Y <input type="checkbox"/> SYNCOPE/Brief LOC duration _____ (min)	<b>"PULMONARY":</b> N <input type="checkbox"/> Y <input type="checkbox"/> HYPERVENTILATION N <input type="checkbox"/> Y <input type="checkbox"/> SHORT OF BREATH N <input type="checkbox"/> Y <input type="checkbox"/> NUMBNESS/TINGLING loc: _____  <b>"GI"</b> N <input type="checkbox"/> Y <input type="checkbox"/> NAUSEA N <input type="checkbox"/> Y <input type="checkbox"/> VOMITING N <input type="checkbox"/> Y <input type="checkbox"/> ABDOM. CRAMPS N <input type="checkbox"/> Y <input type="checkbox"/> DIARRHEA
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## REVIEW OF SYSTEMS FOR PAST TWO WEEKS:

	<u>date of onset:</u>			<u>date of onset:</u>	
"Cold (URI)	<input type="checkbox"/> NO	<input type="checkbox"/> YES	Syncope	<input type="checkbox"/> NO	<input type="checkbox"/> YES
Sore Throat	<input type="checkbox"/> NO	<input type="checkbox"/> YES	Palpitations	<input type="checkbox"/> NO	<input type="checkbox"/> YES
Fever/Chills	<input type="checkbox"/> NO	<input type="checkbox"/> YES	Nausea	<input type="checkbox"/> NO	<input type="checkbox"/> YES
Sunburn>20%	<input type="checkbox"/> NO	<input type="checkbox"/> YES	Vomiting	<input type="checkbox"/> NO	<input type="checkbox"/> YES
Cellulitis	<input type="checkbox"/> NO	<input type="checkbox"/> YES	Diarrhea	<input type="checkbox"/> NO	<input type="checkbox"/> YES
Vaginitis	<input type="checkbox"/> NO	<input type="checkbox"/> YES	Constipation	<input type="checkbox"/> NO	<input type="checkbox"/> YES
Dysuria	<input type="checkbox"/> NO	<input type="checkbox"/> YES	Fracture	<input type="checkbox"/> NO	<input type="checkbox"/> YES
Hematuria	<input type="checkbox"/> NO	<input type="checkbox"/> YES	Strain/Sprain	<input type="checkbox"/> NO	<input type="checkbox"/> YES
<input type="checkbox"/> Other: Describe/date of onset:			(females) LMP date	_____	

Immunizations in past two weeks? ☐ NO ☐ YES--Date & Type:

<b>DIAGNOSIS:</b> <input type="checkbox"/> HEAT EXHAUSTION <input type="checkbox"/> HEAT INJURY <input type="checkbox"/> HEAT STROKE <input type="checkbox"/> RHABDOMYOLYSIS	<input type="checkbox"/> HEAT CRAMPS <input type="checkbox"/> DEHYDRATION <input type="checkbox"/> Parade Syncope/Exertional Collapse <input type="checkbox"/> Other _____
<b>DISPOSITION:</b> <input type="checkbox"/> HOSPITAL <input type="checkbox"/> QUARTERS _____ days <input type="checkbox"/> LIGHT DUTY _____ days <input type="checkbox"/> Regular Duty (RTD)	

\*\* If not admitted, ensure ER-Heat Set and follow-up with Physician within 24 hours.

Nurse Name/Duty Phone Number (print) \_\_\_\_\_

Place Patient Label here

## Appendix A (cont)

**Preventive Medicine Exertional Heat Illness Form**

Date: \_\_\_\_\_

LAB TESTS ORDERED: ☐ ER-Heat Set ☐ TC ☐ CBC ☐ Tests for ARF ☐ Other:☐ U/A ☐ before ☐ after hydration ☐ Repeat ER - Heat Set**LAB RESULTS (First set):****TIME DRAWN:**

Na		Glucose		CK		Hgb		Urine SG	1.0 _____
K		Creatinine		AST		Hct		Urine pH	
Cl		Uric Acid		ALT		WBC		Dipstick +':s:	
HCO <sub>3</sub>		PT		LDH		Plts		Occult Blood Casts*	_____
BUN		PTT		Sickledex		Diff.		WBC/hpf RBC/hpf	_____

\* especially pigmented granular casts

<b>SEVERITY</b> (per Table):	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>
Dehydration:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Encephalopathy:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Renal Function:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Cell Lysis:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**EVALUATION (H/P):** LIST all current medication, supplements/herbals, chronic illness and any illness in past two weeks.Patient healthy before exercising? ☐ YES ☐ NO:

Rank/Service \_\_\_\_\_ Length of Service \_\_\_\_\_  
 MOS \_\_\_\_\_ Height \_\_\_\_\_  
 Weight \_\_\_\_\_ Age \_\_\_\_\_  
 Sex \_\_\_\_\_ Last APFT score \_\_\_\_\_

Place Patient Label here

PM Name/Duty Phone Number (print) \_\_\_\_\_

**The proponent of this publication is the Department of Preventive Medicine. Users are invited to send comments and suggested improvements on a DA Form 2028 (Recommended Changes to Publications and Blank Forms) directly to the proponent.**

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